SEQUENCE LISTING

<110> APPLIED RESEARCH SYSTEMS ARS HOLDING N.V.

<120> CHEMOKINES MUTANTS HAVING IMPROVED ORAL BIOAVAILABILITY

<130> WO555

<160> 13

<170> PatentIn version 3.1

<210> 1

<211> 91

<212> PRT

<213> Escherichia coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 1

```
Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
           -20                 -15                 -10

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro
        -5              -1  1               5
```

```
Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys
10                  15                  20                  25

Glu Tyr Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val Phe
                30                  35                  40

Val Thr Ala Ala Asn Ala Gln Val Cys Ala Asn Pro Glu Lys Lys Trp
            45                  50                  55

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
        60                  65
```

<210> 2

<211> 66

<212> PRT

<213> Escherichia coli

<400> 2

```
Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala Arg Pro
1               5                   10                  15

Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys Cys
            20                  25                  30

Ser Asn Pro Ala Val Val Phe Val Thr Ala Ala Asn Ala Gln Val Cys
        35                  40                  45

Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu Glu
    50                  55                  60

Met Ser
65
```

<210> 3

<211> 92

<212> PRT

<213> Escherichia coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 3

```
Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
            -20                 -15                 -10

Leu Cys Ala Pro Ala Ser Ala Met Ser Pro Tyr Ser Ser Asp Thr Thr
        -5              -1  1               5

Pro Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile
10                  15                  20                  25

Lys Glu Tyr Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val
                30                  35                  40

Phe Val Thr Ala Ala Asn Ala Gln Val Cys Ala Asn Pro Glu Lys Lys
            45                  50                  55

Trp Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
        60                  65
```

<210> 4

<211> 91

<212> PRT

<213> Escherichia Coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 4

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro
-5 -1 1 5

Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys
10 15 20 25

Glu Tyr Phe Tyr Thr Ser Asn Lys Cys Ser Asn Pro Ala Val Val Phe
30 35 40

Val Thr Ala Ala Asn Ala Gln Val Cys Ala Asn Pro Glu Lys Lys Trp
45 50 55

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 5

<211> 66

<212> PRT

<213> Escherichia coli

<400> 5

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly
20 25 30

Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Glu Asn Arg Gln
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser
50 55 60

Leu Glu Met Ser
65

<210> 6

<211> 92

<212> PRT

<213> Escherichia coli

<400> 6
<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 6

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Met Ser Pro Tyr Ser Ser Asp Thr Thr
-5 -1 1 5

Pro Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile
10 15 20 25

Lys Glu Tyr Phe Tyr Thr Ser Asn Lys Cys Ser Asn Pro Ala Val Val
30 35 40

Phe Val Thr Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys
45 50 55

Trp Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 7

<211> 89

<212> PRT

<213> Escherichia coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 7

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Tyr Ser Ser Asp Thr Thr Pro Cys Cys
-5 -1 1 5

Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr
10 15 20 25

Phe Tyr Thr Ser Asn Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr
30 35 40

Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg
45 50 55

Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 8

<211> 91

<212> PRT

<213> Escherichia coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 8

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro
-5 -1 1 5

Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys
10 15 20 25

Glu Tyr Phe Tyr Thr Ser Asn Lys Cys Ser Asn Pro Ala Val Val Phe
30 35 40

Val Thr Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp
45 50 55

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 8

<211> 70

<212> PRT

<213> Escherichia coli

<400> 8

Ala Ser Leu Ala Ala Asp Thr Pro Thr Ala Cys Cys Phe Ser Tyr Thr
1 5 10 15

Ser Ala Gln Ile Pro Gln Asn Phe Ile Ala Asp Tyr Phe Glu Thr Ser
20 25 30

Ser Gln Cys Ser Lys Pro Gly Val Ile Phe Leu Thr Lys Ala Ser Ala
35 40 45

Gln Val Cys Ala Asp Pro Ser Glu Glu Trp Val Gln Lys Tyr Val Ser
50 55 60

Asp Leu Glu Leu Ser Ala
65 70

<210> 9

<211> 91

<212> PRT

<213> Escherichia coli

<400> 9

Ala Pro Met Gly Ser Asp Pro Pro Thr Ala Cys Cys Phe Ser Tyr Thr
1 5 10 15

Ala Arg Lys Leu Pro Arg Asn Phe Val Val Asp Tyr Tyr Glu Thr Ser
20 25 30

Ser Leu Cys Ser Gln Pro Ala Val Val Phe Gln Thr Ala Ala Ser Ala
35 40 45

Gln Val Cys Ala Asp Pro Ser Glu Ser Trp Val Gln Glu Tyr Val Tyr
50 55 60

Asp Leu Glu Leu Asn
65

<210> 10

<211> 91

<212> PRT

<213> Escherichia coli

<220>

<221> SIGNAL

<222> (1)..(23)

<223>

<400> 10

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
1 5 10 15

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro
20 25 30

Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys
35 40 45

Glu Tyr Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val Phe
50 55 60

Val Thr Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp
65 70 75 80

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
85 90

<210> 11

<211> 92

<212> PRT

<213> Escherichia coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 11

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Met Ser Pro Tyr Ser Ser Asp Thr Thr
-5 -1 1 5

Pro Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile
10 15 20 25

Lys Glu Tyr Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val
30 35 40

Phe Val Thr Arg Lys Asn Lys Gln Val Cys Ala Asn Pro Glu Lys Lys

45 50 55

Trp Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 12

<211> 89

<212> PRT

<213> Pichia Pastoris

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 12

Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
-20 -15 -10

Leu Cys Ala Pro Ala Ser Ala Tyr Ser Ser Asp Thr Thr Pro Cys Cys
-5 -1 1 5

Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr
10 15 20 25

Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr
30 35 40

Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg
45 50 55

Glu Tyr Ile Asn Ser Leu Glu Met Ser
60 65

<210> 13

<211> 91

<212> PRT

<213> Escherichia Coli

<220>

<221> mat_peptide

<222> (24)..()

<223>

<400> 13

```
Met Lys Val Ser Ala Ala Ala Leu Ala Val Ile Leu Ile Ala Thr Ala
            -20                 -15                 -10

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro
        -5              -1  1               5

Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys
10                  15                  20                  25

Glu Tyr Phe Tyr Thr Ser Asn Lys Cys Ser Asn Pro Ala Val Val Phe
                30                  35                  40

Val Thr Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp
            45                  50                  55

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser
        60                  65
```

<210> 14

<211> 70

<212> PRT

<213> Escherichia coli

<400> 14

Ala Ser Leu Ala Ala Asp Thr Pro Thr Ala Cys Cys Phe Ser Tyr Thr
1 5 10 15

Ser Arg Gln Ile Pro Gln Asn Phe Ile Ala Asp Tyr Phe Glu Thr Ser
20 25 30

Ser Gln Cys Ser Lys Pro Gly Val Ile Phe Leu Thr Lys Arg Ser Arg
35 40 45

Gln Val Cys Ala Asp Pro Ser Glu Glu Trp Val Gln Lys Tyr Val Ser
50 55 60

Asp Leu Glu Leu Ser Ala
65 70

<210> 15

<211> 69

<212> PRT

<213> Escherichia coli

<400> 15

Ala Pro Met Gly Ser Asp Pro Pro Thr Ala Cys Cys Phe Ser Tyr Thr
1 5 10 15

Ala Arg Lys Leu Pro Arg Asn Phe Val Val Asp Tyr Tyr Glu Thr Ser
20 25 30

Ser Leu Cys Ser Gln Pro Ala Val Val Phe Gln Thr Lys Arg Ser Lys
35 40 45

Gln Val Cys Ala Asp Pro Ser Glu Ser Trp Val Gln Glu Tyr Val Tyr
50 55 60

Asp Leu Glu Leu Asn
65